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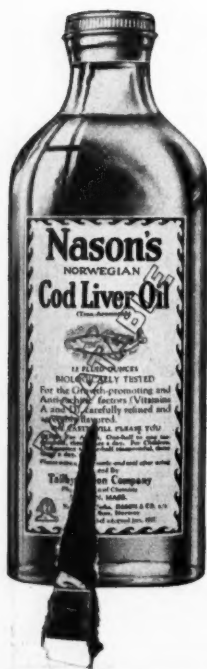


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## ORIGINAL ARTICLES

### MILK AND ITS RELATION TO HEALTH\*

By

R. C. BATES, M.D.

122 WATERMAN ST., PROVIDENCE, R. I.

Milk is the most valuable of the foods of man, but it may be one of the most dangerous. It is the only single article of diet which contains practically every one of the elements which are necessary to human nutrition. Its danger comes from the ease with which pathogenic bacteria may gain access to milk and spread disease.

The quality of milk in this country has gradually improved during the past decade, as the result of efforts by official and voluntary public health agencies. As a consequence, there has been a steady increase in consumption of milk and milk products, so that today the American people are using almost a quart per person per day.

The dairy industry is in better condition today than it was eleven years ago when the campaign against Bovine Tuberculosis was started. At one time it was thought the campaign would turn the public taste against milk consumption but this has proved to be unfounded. Although approximately 50 per cent of the tuberculous cattle have been eliminated, the work of finishing the task will require great persistency, skill and organization according to Dr. John R. Mohler, of the Department of Agriculture.

The Department of Agriculture reports continual increase in the per capita consumption of milk and cream in this country. The per capita consumption in 1926 was 55.3 gallons as against 54.75 gallons in 1925, and 43 gallons in 1920. The total consumption of milk and cream for 1926 was placed at 56,417,000,000 pounds.

The diseases which have been spread by milk are: tuberculosis, typhoid and para-typhoid fever, diphtheria, scarlet fever, septic sore throat,

dysentery, infantile paralysis, epidemic arthritic erythema, foot-and-mouth disease.

Generally milk becomes infected from human sources. Sometimes on the farm, sometimes at the dairy or in transportation and occasionally in the household. Sometimes milk becomes infected as a result of disease of the cow as in the case of bovine tuberculosis, foot-and-mouth disease, streptocci, etc.

*Amount of Bovine Infection in Milk.* Bovine Tuberculosis has declined according to the reports of the Bureau of Animal Industry, the average infection being about 2.18 per cent as compared with approximately 4.9 per cent a few years ago.

It has been estimated that 5-50% of cows of the world are infected with tuberculosis. In England one in three cows are said to be positive reactors.

In two large cities in the British Isles, the milks examined showed about 10% infected with tuberculosis. Of 200 samples tested in New York City, 100 specimens of raw certified milk showed no infection. One hundred specimens of ordinary milk showed tubercle bacilli in 20% before pasteurization and none after pasteurization.

In 1910 a study of 551 samples of milk in 4 American cities showed the presence of tubercle bacilli in 46 or 8.3 per cent. This was assumed to be fairly representative of the milk supply of American cities at that time.

Over a period of 23 years the results of the examination for tubercle bacilli in milk sent to Manchester, England, showed an average infection with this condition of nearly 1 in 10 of milk supplied.

From the findings of Gordon & Brown, of Boston, Burner of Paris, Park in New York there is no question that the pasteurizing of milk and butter and cheese lessens the incidence of bovine tuberculosis in children.

*Differentiation of Type.* Robert Koch in 1882, isolated and cultivated the tubercle bacillus. No difference was recognized between the human and bovine type until it was demonstrated by Theobald Smith in 1898. In 1901 Koch had de-

\*Read before the W. W. Keen Club, April, 1929.

clared that human and bovine tuberculosis were two different diseases and that it was unnecessary to protect man from the latter. Differentiation between the two types of organisms are strikingly shown by animal inoculation. Guinea-pigs inoculated with the bovine type die more quickly and show more extensive lesions than those infected with human bacilli. The bovine bacillus will generally kill a rabbit within two or three weeks while the human bacilli produce a mild and slow disease and occasionally the rabbits do not die.

Bovine tubercle bacilli get into milk either directly as a result of tubercular cows, or indirectly through the manure. It is stated that the average percentage of tubercle bacilli found in market milk would be about 5 per cent.

The bacilli are also found in butter and Schroeder and Cotton found that living bacilli will retain their infective properties 160 days in salted butter when kept without ice.

*Persistence of Tubercle Bacilli in Butter from Tuberculous Milk.* Cookson shows that pasteurization did not destroy the bacilli at all times. He collected specimens of milk from five tuberculous cows and the presence of the tubercle bacillus was demonstrated in each sample. The milks were pasteurized, butter made and all five specimens of milk contained the tubercle bacilli.

Meat is considered an almost negligible factor in the transmission of bovine tuberculosis to human beings. The principal means of its transmission is the raw milk of tuberculous cows.

The systematic plan of tuberculosis-eradication work of the Department of Agriculture, in co-operation with respective States, was started in 1917. The effects of the disease upon humans was not emphasized until the public was educated through several sources and today we realize the importance of this phase of the public health. The Federal Government and all States are making substantial expenditures for the eradication of tuberculosis in cattle. Tuberculosis can be eradicated in cattle and we know that herds that have been free from the disease will remain free until the infection is reintroduced by a tuberculous cow or in some other way.

*Tuberculin Test.* From 1892, when tuberculin was introduced into the United States, to 1917, many thousands of herds had been subjected to

its searching qualities, and its reliability has been definitely established. More than 34,000,000 cattle have been tested or retested from 1917 to January 31, 1927. Of the 1,173,626 reactors practically all were autopsied and definite microscopic lesions of tuberculosis demonstrated in 91.7 per cent. When lesions are not demonstrated on post-mortem, glands or other tissues showing abnormality, are sent to the laboratory and 20% of the specimens showed the presence of the tubercle bacillus.

*Accredited-Herd Plan.* The attempts to exterminate tuberculosis from cattle resulted in the plan of accrediting herds of cattle which was started in 1917. This consists in certifying by the State and National governments the freedom from tuberculosis of herds that have undergone two annual tuberculin tests without reactors or three semi-annual tests without reactors. Thousands of herds have been transformed into tuberculosis free herds and kept in that status.

Some time ago 18,795 herds were retested annually to determine if they became reinfected, and 5 percent were found to be infected. The cause of this reinfection in most cases was due to the addition of cattle, which in later tests proved to be tuberculous.

In 1922, there was 18,114 accredited herds in this country while in 1927 these had increased to 126,557. In 1922, there were 191,699 once-tested herds in 1927, 1,498,820. These figures give a vivid picture of the enormous work being done in the eradication of tuberculous cattle.

*Differentiation of Disease.* It is believed by bacteriologists to be impossible to decide clinically whether a case of tuberculosis is due to human or bovine type. Human pulmonary tuberculosis is practically always due to the human type, and cases of primary intestinal infection due to the bovine type, if the milk is infected, but in a combination of both types the location of tissue involved and progress of the disease suggests only a probability as to the exact type of bacillus present. For bone and glandular types of the disease it is more likely to be of bovine species if the milk supply is infected. Transformation of types of bacilli in the body has not been proven satisfactorily.

*Amount of Bovine Infection in Children.* Park believes that in all cases of tuberculosis in chil-



dren, 10% are due to the bovine type of bacillus.

Mitchell of Edinburgh states that 90% of tuberculous gland disease in that city is due to the bovine bacillus while Griffith, in England, found 72% of tuberculous gland conditions were due to the bovine tubercle bacillus. He also believed that a considerable amount of human tuberculosis was caused by the bovine bacillus, especially in children under 5 years. Thus we see different countries are infected in varying degrees, also different sections of a country show varying incidence rates for the disease.

Gordon and Brown identified the bovine type of organism in 33⅓ percent of their series while Park and Krumwilde in a large group of cases found 25 percent to be caused by the bovine bacillus.

Dr. Charles Mayo states that the majority of cases of tuberculosis of the neck, intestines and abdomen are found in children from the farms. It has also been demonstrated that a larger percentage of enlarged cervical glands had been found among the rural reactors than in those from city children.

In Massachusetts it was found that about 50% of the children exposed to Pulmonary Tuberculosis became infected by the time they were six years old, and that one year later, at age seven they showed a high percentage of Hilum Tuberculosis. Also the amount of tuberculous infection was 12% higher in rural children than in urban children.

The control of tuberculosis is dependent upon two things, lessening the amount of infection from both human and bovine sources. Children brought up on the farms are in more danger from tuberculosis of bovine origin than are the city children because they are fed raw milk coming from tuberculous cows.

*Milk-Borne Epidemics.* The original laws dealing with milk had only to do with its food value, and they established minimum standards of total solids and butter fat content, thus doing away with dilution and adulteration or filling of milk, i.e., substituting for butter fat some cheaper form of fat. These laws did very well in that they assured the customer of getting what he was paying for. They did not, however, protect him from getting what he was not paying for in the way of disease producing germs.

North lists 500 milk-borne epidemics reported between 1857 and 1920, due to the following causes: typhoid fever, 375; scarlet fever, 128; diphtheria, 55; and septic sore throat, 22.

In 1924, the American Child Health Association conducted a survey regarding milk-borne epidemics and found for the years 1924 and 1925, forty-three were reported for 1924, and forty-four for 1925.

Crumbine reported June 1, 1929, 43 milk-borne epidemics involving 2,129 cases and 94 deaths had occurred in the United States and Canada during 1928.

*Typhoid Fever.* Dr. Crumbine, as secretary of the Milk Committee of the American Child Health Association, reported the milk-borne epidemics occurring in 1926 in the United States and Canada and showed fifty-three typhoid fever epidemics involving 1,191 cases and only four epidemics of septic sore throat resulting in 1,038 cases. In the recent severe epidemics of typhoid in Montreal, there were 5,014 cases from March 1, 1927 and 488 deaths. The cause of this outbreak was a typhoid carrier employed in a large pasteurization plant. This was the most serious milk-borne epidemic in Canada's experience and it is note worthy that the total number of cases of milk-borne typhoid reported since 1906, is but one-fifth of the number of cases occurring in the seven weeks of the Montreal outbreak. The Canadian Public Health Association recently reported a total of 21 milk-borne epidemics involving 619 cases occurring in the Dominion of Canada since 1906. Sixteen of these were typhoid fever epidemics; the remaining five were due to scarlet fever.

Milk is usually infected with typhoid by an ambulant carrier or convalescent cases. In Washington, D. C., a study was made of all the typhoid cases from 1907 to 1910, and 10% were found to be due to milk.

Welsh, Dehler and Havens conducted a survey of 1,076 persons employed in the dairy industry of Alabama and were able by repeated examinations to find a carrier rate of 5.1% for typhoid fever among their dairy employees.

*Septic Sore Throat.* The presence of hemolytic streptococci in milk has always created considerable discussion in regard to their significance and possible relation to human disease. Accord-

ing to Smith, Brown and others, the Streptococcus causing septic sore throat is the streptococcus Epidemicus. This streptococcus is of human origin and it may reach the milk either directly from a human case or carrier. Hemolytic streptococci, non-pathogenic for humans, are found in the milk of many clinically normal cows. Parke and others are of the opinion that there is no difference in morphology of the human and bovine streptococci.

Frost and Carr from studies on the streptococcus epidemicus traced an epidemic of sore throat to a milker on the farm who had evidently passed the infection to the cows.

Benson and Sears analyzed an epidemic of septic sore throat occurring in Portland, Oregon, in 1922. During this investigation a milker was found with a severe sore throat and one cow had extensive mastitis.

The recent severe epidemic in Lee, Massachusetts, occurred in 1928. About 950 persons were affected and there were forty-eight deaths. The infection was traced to a single cow which had a severe mastitis.

In a recent questionnaire by Dr. Crumbine it was found for 1926, that five epidemics of septic sore throat involved as many cases of this disease as did 54 epidemics of typhoid fever. In these epidemics the usual source of infection was a worker in the plant who showed the presence of hemolytic streptococcus in his throat.

*Undulant Fever.* Undulant or Malta fever has probably been prevalent in the Mediterranean countries at least for many hundreds of years. Marston wrote the first description of Malta fever in 1859, differentiating it from typhoid fever and typhus fever. Bruce discovered the organism, the cause of the disease, in 1887. Ten years later Bang discovered the causative organism of contagious abortion in cattle which he designated Bacillus Abortus. Bacteriological and serological investigation made by Evans, Fleischner, Meyer and Shaw and others since 1918, have led to the classification of these organisms as varieties of a single species known as *Brucella melitensis*.

In 1905, Craig reported the first case of Malta fever in the United States. There seems to be agreement that the procine strain of the organism is the most highly infectious.

Apparently children under 5 years of age are not highly susceptible to the disease. Last year in the United States 367 cases were recorded and many more probably escaped record. The disease is much more common in middle life and the incidence is higher in males.

The possibility of infection through butter and cheese is also being considered seriously. The disease has gained a foothold in New England and it has been estimated that 50 to 75% of the herds are infected.

*Poliomyelitis.* Knapp, Godfrey and Aycock state that a recent outbreak of poliomyelitis pointed to milk as the source of infection, but were not of the opinion that it was the usual mode of transmission of the disease. Aycock reports an epidemic of poliomyelitis occurring in Broadstairs, England, and believes the milk supply of one dealer was the common source of infection.

*Epidemics Due to Certified Milk.* Williams reports an alleged para-typhoid outbreak among 60 children fed on certified milk. Another outbreak occurred at New Rochelle, N. Y., in 1924, in which certified milk was responsible for 60 cases of enteritis among infants and adults. Para-typhoid B was isolated from their stools and also from stools of a milker employed at the dairy farm. There was an outbreak of diphtheria at Westchester County, N. Y., in 1920, due to certified milk.

In 1925, Dr. W. H. Park, of New York City Health Department, stated that he had been unable to trace any case of communicable disease to certified milk supplied to New York City during the past twenty years.

*Infant Mortality.* It was early recognized that diarrheal disease played a tremendous part in the mortality of infants; especially among those who were bottle-fed. New York had a death rate of 25; one-fourth of these infants were under 1 year, and more than one-half were under 5. Twenty-five years ago, much of New York City's milk had a bacterial count higher than ordinary sewage, and most other large cities were no better off.

Park and Holt, in 1903, reported that the use in New York City of milk containing 7 million to 25 million organisms per cubic centimeter, and which was subsequently pasteurized, was ac-

accompanied by a distinct *increase in the incidence of diarrheal disease*. Scholberg and Wallis, in 1909-10, studied the chemical changes in milk produced by bacteria and their relation to an epidemic of diarrheal disease in infants. They found that organisms formed products, which reacted injuriously upon the pancreas and which brought disturbances in metabolism with attendant diarrheal.

*Diarrheal Diseases.* The importance of diarrheal diseases in children as an outstanding cause of death is recognized. Before pasteurization more than 50 per cent of the infant mortality during the summer months was due to diarrheal diseases; even since the general improvement in the milk supply brought about by pasteurization, these diseases constitute a large proportion of the causes of deaths in children during the hot season.

The decrease in diarrheal diseases in Providence as shown on *Chart No. 1* has been remarkable. Without question this improvement in milk supply together with pasteurization have been factors in this reduction.

The relation of diarrheal diseases in children to the milk supply has been an important sanitary problem. Prolonged search for specific organisms in milk that could be held responsible for such disease

has been unsuccessful. The quantitative bacterial condition seems to exert the harmful effects. Children below 12 months are generally much more sensitive to the ordinary bacterial changes produced in milk. The harm may be due to chemical alterations produced in the milk by bacterial growth before ingestion and perhaps by the continuation of abnormal fermentation and putrefaction continued in the intestinal canal. It is therefore highly important in the prevention of infantile diarrheal, not only to guard against contamination with specific pathogenic micro-organisms, but to hold the *bacterial count down to a minimum* by care in production, refrigeration in transit and proper care of the milk after it reaches the home.

A striking illustration of the deleterious effects of killed bacteria upon human organisms is given in the death rate from gastro-enteritis in infants, which occurred in Baltimore, during 1922, 1923 and 1924. Attention was called to the fact that during the summer of 1922, there was a surprising and inexplicable increase in the mortality rate of infants under two years of age as the result of gastro-enteritis. Although 98 per cent of the milk was pasteurized, the average bacterial count of milk brought in for pasteurization during 1922, 1923 and 1924 was higher than the count during 1921.

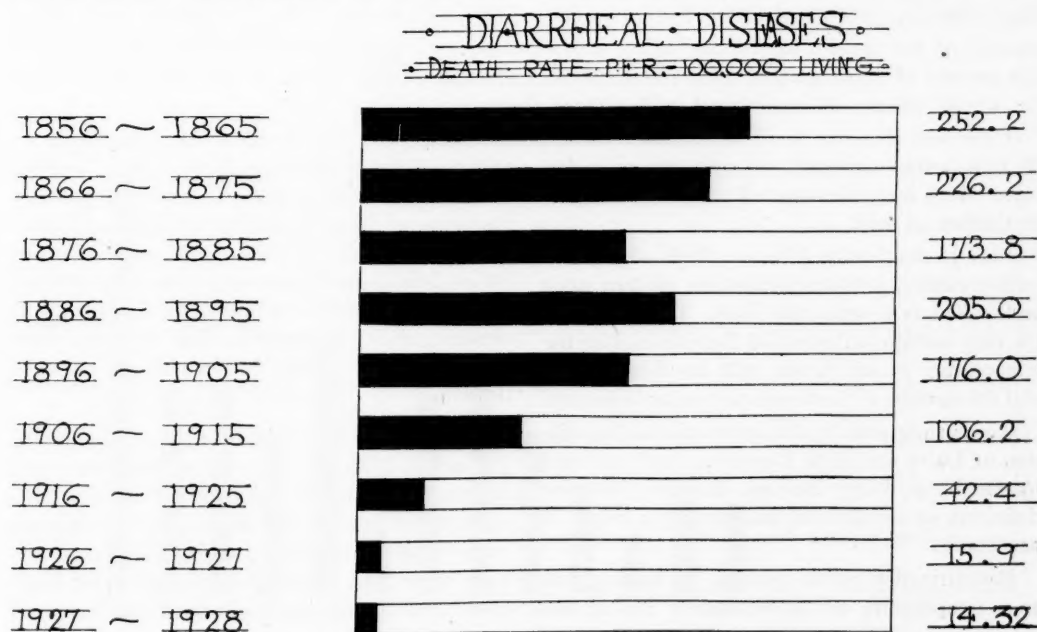


Chart 1

Years ago Park and Holt found that in using milk with high bacterial counts and then pasteurizing same, there was an increase in the amount of diarrheal disease.

Shrader and Swenarton show that high pre-pasteurized bacterial content of milk had an injurious effect upon infants. They found that in the summer of 1922, the peaks in the curves for bacterial count and mortality coincided.

Kelley and Osborn in 1920, found that increased pasteurization in Massachusetts, did not show a relative decrease in percentage of frequency of milk-borne cases.

There is a general tendency in this country towards the pasteurization of all milk except certified. This is shown in the revisions in the Sanitary Code of the New York City Department of Health where three grades of milk are on the New York Market, i.e., Certified Milk, Grade A Pasteurized Milk, and Grade B Pasteurized Milk. Chicago and Boston have recently passed ordinances which allow only two grades of milk sold, i.e.; Certified Raw and Pasteurized. This type of grading of milk is probably the most ideal for both the public and the producers.

*Pasteurization.* Putman in his investigation in Chicago concluded that although pasteurization has been the greatest safeguard in protecting the public from milk-borne diseases, it still had its defects. Mechanical defects and the lack of proper training of personnel was responsible for a certain amount of unpasteurized milk contaminating the whole volume of pasteurized milk.

In the last 18 years there have been recorded 28 milk-borne outbreaks of communicable diseases which have been traced to inadequate pasteurization of milk.

Since pasteurization kills only 99% of the bacteria present it is essential that this product must be handled as a perishable food. The remaining 1% may contain varieties and these depend on the temperature to which the milk has been heated and the number of heat-resistant bacteria present.

It was suggested by the International Association of Dairy and Milk Inspectors, and endorsed by the U. S. Dairy Bureau, that the following definition of commercial pasteurization might be acceptable.

Pasteurization is the process of heating milk to a temperature of approximately 145°F. and

never lower than 142°F., and holding every portion of the milk at that temperature for at least 30 minutes and then promptly cooling it to 50°F. All varieties of pathogenic bacteria found in milk other than the tubercle bacilli and a few of the streptococci are killed within 20 minutes when exposed to a temperature of 136°F. Since this is a shorter exposure and lower temperature than kills the tubercle bacilli, any temperature and time of exposure which destroys the tubercle bacillus is sufficient to destroy all other varieties of pathogenic bacteria in milk. White records extensive experiments on artificially infected milk from tuberculous cows and concludes that by raising the temperature of this milk to 62.5°C. and keeping it at the temperature for 30 minutes, the milk becomes non-infected as far as the bacillus tuberculosis is concerned.

*Difficulties of Pasteurization.* There are many difficulties, economic and otherwise, that make general pasteurization in many communities, particularly the smaller communities, almost impossible. Unless the quantity of milk to be pasteurized is sufficient to make it economically profitable, capital will not jeopardize investment along that line.

The U. S. Public Health Service believes that pasteurization of milk is the most potent single force operating to prevent the transmission of milk-borne disease. Improvements in mechanical design and machinery are necessary to accomplish efficient pasteurization of all milk entering the plant.

Also greater uniformity in the definition of pasteurization is advisable. A study of definitions in numerous milk ordinances revealed the fact that some of them, if enforced as intended, do not insure uniformly effective milk pasteurization. Other definitions of pasteurization, if strictly enforced as intended, would partly destroy the creaming ability of the milk. This fact has a commercial aspect which is recognized by milk dealers.

*The Milk Situation in Providence.* Beginning January 1, 1926, all milk sold in Providence was required to be certified, pasteurized or come from cows under government supervision. Milk from cows under government supervision must not have more than 100,000 bacteria per cubic centimeter, and pasteurized milk must not have over



1,500,000 before pasteurization, and not over 100,000 after pasteurization. The so-called Rose Milk Bill was approved by the legislature April 26, 1926. This fixed the bacterial content of Grade A (from cows under government supervision), Raw Milk as 100,000 bacteria per cubic centimeter, and Grade A pasteurized as 25,000.

An inspector of pasteurization was appointed in October, 1925, and the great improvement shown in the bacterial content of milk as a result of the new rules and better control of pasteurization has been very satisfactory. Chart No. 2 shows the pasteurized content of milk of Providence for the past 12 years. Definite improvement is shown due in a large measure to the education of the dairyman in the proper technique of handling the pasteurizing plant.

In Rhode Island, in 1922, there were fourteen tuberculosis-free herds of cattle under Federal and State supervision and two of these were supplying milk to the Providence market. In 1926, there were 58 herds in Rhode Island supplying milk to Providence in addition to 14 herds from Massachusetts. In January, 1929, there were 390 herds under State and Federal supervision of which 92 were accredited and 12 eligible to become accredited. The general betterment in the milk industry in the State and Providence is undoubtedly due to the constructive legislation passed first by the Board of Aldermen in Provi-

dence and secondly by the 1926 legislature. The ultimate goal of health officers and physicians is the elimination of all tuberculous cattle in the country.

**Certified Milk.** The term "Certified Milk" was coined by Dr. Henry L. Coit of Newark, N. J., who in 1892, formulated a plan for the production of clean, fresh, pure milk under the jurisdiction of a Medical Milk Commission.

The use of the term "Certified Milk" should be limited to milk produced in accordance with the requirements of the American Association of Medical Milk Commissions. The first requisite in the production of the milk is to enlist the cooperation of a trustworthy dairyman who is willing to enter into a contract with the commission. According to the contract the dairyman binds himself to comply with the specifications set forth and in return his milk is certified.

From time to time new standards have been adopted relating to the veterinary inspection of herds and farms, the medical inspection of milk-handling employees, and the bacteriological and chemical examination as to quality and purity.

The production of "Certified Milk" under its high standards may be considered a *super quality product* planned definitely to supply infants and invalids with a *super safe pure milk in its natural state*. By special methods of safety all

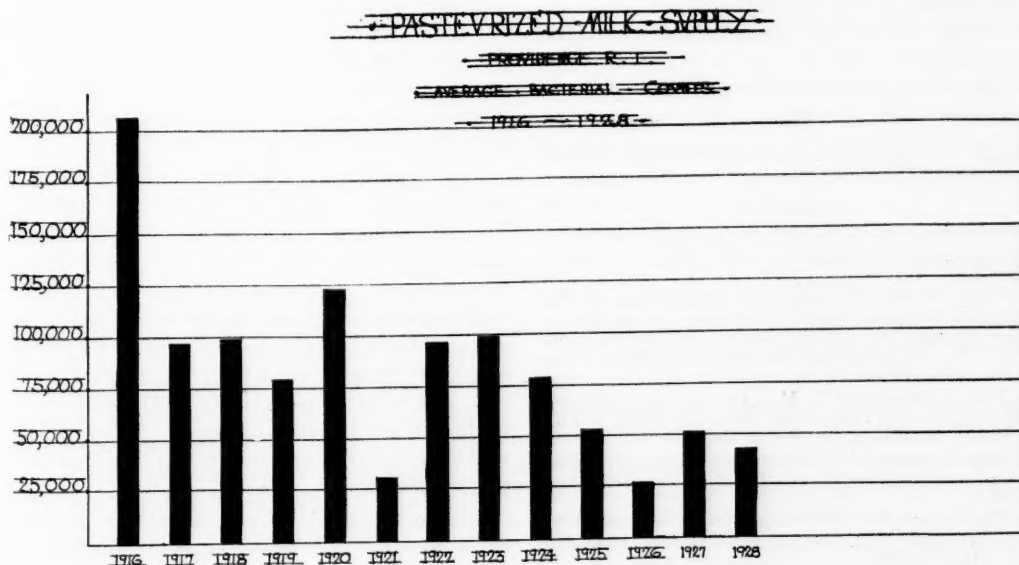
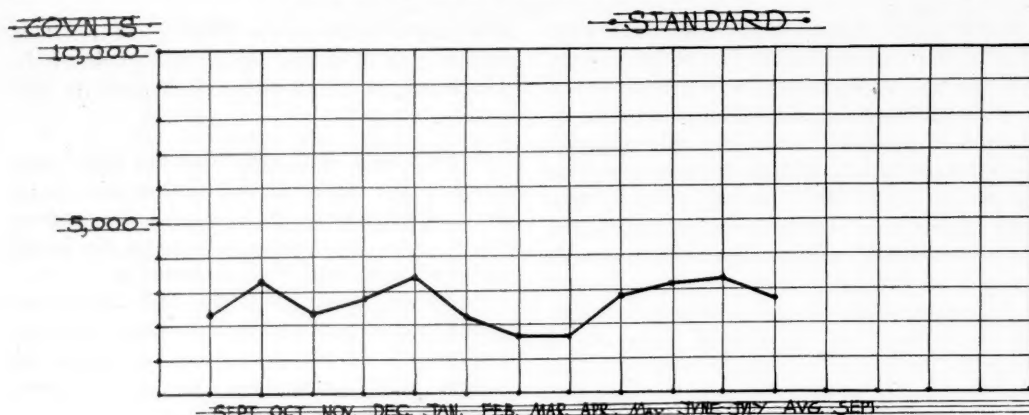


Chart 2



• CERTIFIED MILK SUPPLY •  
 • PROVIDENCE, R. I. •  
 • AVERAGE BACTERIAL COUNTS •  
 • 1928 •  
 Chart 3

known means are employed to exclude pathogenic micro-organisms from the milk. Above all, however, one of the great advantages in the production of "Certified Milk" is to set an ideal for the dairy industry. Dr. John L. Morse believes that the improvement in the general milk supply is due largely to the standards set up for "Certified Milk" by the American Association of Milk Commissions.

Chart No. 3 shows the average bacteria counts of Certified Milk for 1928.

NOTE. The author wishes to thank Dr. Chapin for statistics used in Charts No. 1 and 2.

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#### CHRONIC NON SEASONAL ASTHMA\*

By

C. C. DUSTIN, M.D.

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Formerly, the word "Asthma" included practically all types of periodic dyspnoea, but during the past few decades much advance has been made in the classification of the periodic dyspnoeas, so that now the word can hardly be used without some descriptive phrase.

The separation of cases into those of cardiac, and those of bronchial origin has been helpful. More helpful, however, has been the subdivision of cases of bronchial asthma into those arising from extrinsic and from intrinsic causes. Extrinsic agents may be introduced by inhalation, ingestion, through the unbroken skin or by inoculation. Intrinsic causes may be found in the bronchial tree, or other parts of the body and may include foci of infection, disease of the viscera, metabolic diseases, acute infections, and secondary infections.

Cardiac asthma is of two essential types, and often seen in cases where heart disease has not

\*Read before the Rhode Island Medical Society, June 6th, 1929.

been suspected. (1) In pulmonary stasis and congestion, there is inadequate ventilation, and a retention of an excess of carbonic acid in the blood. The respiratory center is over stimulated and dyspnoea results. (2) Dyspnoea may also arise from a central anoxemia due to a deficient circulation of blood from the left ventricle to the brain. The first condition is seen typically in mitral valvular disease. The blood pressure is low, the heart sounds show evidence of mitral stenosis or incompetence or both, with an accentuated pulmonary second sound, and the pulse is usually rapid, small, and often completely irregular. There are signs of pulmonary congestion, often with congestion of the liver and edema of the extremities. The vital capacity is generally much reduced, as the pulmonary capillaries are distended. Contrasted with this type of cardiac asthma, is the less common condition where there are aortic lesions, and coronary arterial disease, with an anoxemia of the respiratory center. Here the blood pressure is usually elevated, there is evidence of general arterial disease. The attacks are usually nocturnal, starting the patient up from a sound sleep, and may recur when the patient has again fallen asleep. In the lungs the signs of congestion are usually absent. The attack subsides because of increased peripheral circulation from muscular motion, and increased heart action.

It can readily be seen that the mechanism at work in these two types is different, and an understanding of these mechanisms must influence the treatment.

An illustration of the first type is seen in the following:

A colored man of 51 years appeared at the clinic, with a note from a doctor who had made a diagnosis of asthma on the patient's story alone. For seven years there had been periodic attacks of dyspnoea occurring about once in two months and lasting from a few hours to three days. The man had never been seen by a physician during an attack and rest had been his only treatment. This man had had rheumatic fever twelve years previously, and physical examination revealed a tremendously enlarged heart with typical signs of mitral valvular disease, with fairly good compensation. The liver and spleen were palpable and there was slight edema of both ankles. Otherwise the physical and laboratory findings were negative.

The second type of cardiac asthma is illustrated by the following:

A woman of 60 had visited nearly every clinic at the out patient department, seeking relief from periodic nocturnal dyspnoea, and almost constant sighing. There was nothing in her history suggestive of bronchial asthma although she had been repeatedly told she was suffering from asthma.

She appeared much older than her numerical age, showed marked peripheral arteriosclerosis, had a blood pressure of 180/100 and the urine showed a few hyaline casts. There was no elevation of the pulse rate, no edema of the ankles, and the lungs were normal to percussion and auscultation. The X-ray films of the chest showed enlargement of the heart and an aorta of the sclerotic type.

During the examination she was almost constantly sighing and complaining of a sense of suffocation, but both inspiration and expiration were normal. This woman's trouble is unquestionably due to anoxaemia of the brain due to failing circulation; and yet her complaints are entirely of her lungs.

These two types of cardiac asthma are important, for they make up a large share of the cases in older people, referred to the asthma clinic at the Rhode Island Hospital. Such cases are never benefited by any type of protein desensitization, and it should not be attempted. Of course skin sensitization tests are useless. The treatment must be directed toward improving the circulation. In the first group, rest is of greatest importance, combined with whatever drug therapy may be indicated in the individual case. In the second group, at the clinic, we have found small doses of sodium nitrite and bromide very helpful in relieving the nocturnal dyspnoea.

Of the non-seasonal asthmas of extrinsic origin, a typical case is seen in the person who has asthma upon inhaling orris root, house dust, or any other material to which he may be sensitive. The possibilities in this group are legion, and may lead one a merry chase if all the possible sensitization tests are made. A careful history may reveal the offending substance; as in the boy whose attacks occurred only when he cleaned his father's canary bird cages. The symptoms in these essential bronchial asthmas are dependent upon a sudden turgesence of the bronchial mucosa, or a

spasmodic contraction of the bronchial musculature. The attacks are fairly typical. The patient prefers to sit up and leans slightly forward. There is both inspiratory and expiratory difficulty, usually with expiration forced and prolonged. In severe attacks there will be cyanosis. The pulmonary signs are diffuse, sibilant and sonorous rales being present especially with expiration. The sputum is usually light and frothy, the blood nearly always shows an eosinophilia. An hereditary history is usually elicited, or associated allergic conditions exist in other members of the family. The attack may subside in a few hours or may continue for days.

The task of testing patients by the intradermal or scratch methods is wearisome, and usually disappointing. J. S. McLaughlin,<sup>1</sup> reported from the Jefferson Hospital Asthma Clinic over 23,000 individual tests made on 1281 patients suffering from bronchial asthma. Of these 11.3 per cent were positive.

A positive reaction must be interpreted with caution, and its value is dependent on a history of clinical evidence. For instance, we have found many patients, having a positive reaction to corn, but thus far in no case has the clinical evidence justified our incriminating the corn. On the other hand we have learned that a positive reaction with orris root, an ingredient of nearly all face powders, is usually of clinical significance.

Skin tests with the foods are even more disappointing than are the tests with the epidermals and plant proteins, and our success with the bacterials has been practically nil.

In the group of asthmas of intrinsic origin infection stands first. In 60 per cent of our cases routine X-ray examinations showed evidence of chronic infection in the nasal accessory sinuses, and our success in relieving the patient from attacks has been largely dependent upon the thoroughness with which these nasal infections have been treated. In some of these cases, the infection was not suspected until revealed by the X-ray films. The focus of infection may be at tooth roots, and is often in the lungs. When the focus is in the lungs the sputum nearly always shows streptococci as the predominating organisms. In one case bronchial asthma of six months duration, promptly cleared up when a subacute endocervicitis was actively treated in the gynecological clinic. In one young woman attacks were ex-

perienced only when she was markedly constipated, and relief of constipation has stopped her asthma. A syphilitic had typical attacks, which ceased after his second dose of arsephenamine.

In treating cases of the extrinsic type the common method is to eliminate the particular external substance to which the patient is sensitive, if it can be found. Rackemann<sup>2</sup> believes that in certain cases, especially children, the removal of the exciting cause can result in a permanent cure, but in most of the cases the extent of the cure cannot be determined. He has shown that clinical cure can exist in spite of the existence of positive skin reactions. Consequently the possibility that positive reactions may represent past history rather than present illness is suggested.

Our best results have been obtained in the group classed as intrinsic in origin.

Operative procedures, vaccines, and drug therapy have been employed. I believe most of the cases, showing infected nasal accessory sinuses, could be relieved if operative procedures could be employed more generally.

It is sometimes difficult to convince a patient that his asthma may be due to some diseased condition in his nose, and it may be even more difficult to persuade an already overworked nose and throat department that the operations are necessary. In the cases thoroughly operated prompt relief has been usual.

Our experience with vaccines has been limited but agrees well with the results obtained by Walker<sup>3</sup> at the Peter Bent Brigham Hospital. We have had success only with autogenous vaccines containing streptococci. Cases in which virulent haemolytic streptococci are recovered from the sputum, show the most striking response to vaccine therapy.

Of the drugs available, adrenalin is still the best means of stopping an attack. Probably small doses of 5 minims of 1 to 1000 solution is safest unless the patient's tolerance for the drug is known.

Ephedrine in doses of from  $\frac{1}{4}$  gr. to  $\frac{3}{4}$  gr. by mouth, will stop about 80 per cent of asthmatic attacks, if it is taken at the first signs of onset. Many patients will carry ephedrine with them constantly, and state that it is good insurance against attacks. Where operation on infected antra and sinuses is impracticable or has been refused, nasal sprays containing one per cent of



ephedrine have proved very useful, probably because they promote better sinus drainage.

In long standing cases with a considerable degree of chronic lung infection iodides in small doses, but taken constantly will help materially in preventing attacks, and renders the sputum less tenaceous. When attacks cannot be relieved by the use of adrenaline or ephedrine, morphine will practically always give relief.

#### *Summary*

1. Cardiac Asthma of the two types described must be differentiated from essential bronchial asthma.

2. Skin sensitization tests yield a rather low percentage of positive reactions, but the negatives are of value in ruling out suspected substances.

3. Foci of infection, especially in the nasal accessory sinuses are of the first importance, and are too frequently disregarded.

4. Streptococcus vaccine therapy is valuable aid to surgical and drug treatment.

#### *References*

<sup>1</sup>J.A.M.A., Sept. 10, 1927. <sup>2</sup>Arch. Int. Med., March, 1928. <sup>3</sup>Arch. Int. Med., April, 1929.

### RULES GOVERNING THE CHILD WELFARE STATIONS

*Submitted by the Child Welfare Committee*

WILLIAM P. BUFFUM, M.D., Chairman

PROVIDENCE, R. I.

The following rules are those describing the work of the Child Welfare Stations, formerly called the Well Baby Clinics. These are held in the schools and community centers and mothers are encouraged to bring their babies and children to them for weighing, examination and advice about hygiene and health habits.

These rules are drawn up by the Child Welfare Committee which is composed of physicians doing the work and representatives of the Health Department, District Nursing Association and various social agencies interested.

The purpose of the Child Welfare Station is as follows:

1. The examination of infants and preschool children. The reporting of diseases and defects to the parent, with explanation of their significance and the desirability of visiting his physician for treatment.

2. The supervision of the diet and hygiene of well infants and children up to the school age.

The procedure of the Child Welfare Station shall be as follows:

1. When children are brought to the Child Welfare Station they shall be given a complete physical examination and this examination recorded on the card provided for that purpose.

Defects and diseases shall be noted on the card and briefly explained to the mother. A form shall be filled out noting the defects found and addressed to the patient's physician, or in case of inability to pay a physician this letter may be addressed to a hospital clinic.

It is especially important that no medical treatment at all should be given at the Child Welfare Station, even for colds, pin worms, ring worm, etc. This is for two reasons. In the first place, if children are brought in for minor ailments and treated for them, the main function of the Welfare Station is obscured and less time and attention is given to the routine examination. Secondly, if any treatment is given, the Welfare Station physician is led into the false position of giving free treatment to the patient of another physician. If treatment is required, the private physician, the hospital clinic and the city physician are always available. In every such case instructions must be given to take the patient to his regular physician as it is only by co-operation between the Welfare Station and other physicians that good results can be obtained.

2. If a baby is considered a well baby, his feedings may be regulated and followed up by the Welfare Station. This does not mean that so called feeding cases with any considerable degree of malnutrition shall be cared for by the Welfare Station as these are sick babies and should be referred to a physician or clinic.

Breast fed infants should return to the station at least once a month and bottle fed at least once in two weeks.

All babies not gaining properly should be seen by the Welfare Station physician.

All feedings shall be prescribed by the physician. Nurses shall not be allowed to change

formulae except as in emergency measure, and this shall be reported at once to the Welfare Station physician.

It is considered inadvisable to attempt to standardize the methods of feeding, but in general it is recommended that milk be sterilized for babies up to 1 year. After 1 year of age the child should be given a pasteurized milk, preferably of the grade "A" standard.

Cod Liver Oil is recommended for all babies.

It is recommended that mothers be advised to have the babies vaccinated at 2 months of age. They should have babies over 6 months and pre-school children given toxin anti-toxin immunization and Schick tested 6 months later.

No child with a contagious disease may come to the Welfare Station.

Babies under the care of a private physician may be weighed at the station but physical examination or advice regarding feeding in these cases should not be given except at the request or with the permission of the physician.

The child welfare nurses shall co-operate closely with the private physicians, referring back to them any babies showing symptoms of illness. The child welfare nurses shall do their utmost to see that the instructions of the attending physician are carried out in the home.

The name of the family doctor is to be recorded when the baby is admitted to a child welfare station so that in case it is necessary to refer child back to him at any time his name may be used on the referring card.

#### *Regulations for Nurses*

The nurse doing the follow-up work from the Welfare Stations shall be subject to the following regulations:

1. No nurse may prescribe or change a formula except in emergency and shall then get in touch with the Welfare Station or family physician concerning it.

2. The nurse may advise mothers to give their babies a little zweiback, cereal, and soup after 5 months; strained vegetables after 6 months. (This applies only to normal babies).

3. In case of diarrhea the nurse may advise the mother to omit feeding (substituting boiled water) and to consult the doctor immediately.

4. Nurses may strap a protruding umbilicus and refer baby to clinic or private doctor.

5. Nurses may advise orange juice, tomato juice and Cod Liver Oil after 6 weeks to babies not under supervision of private physician.

6. Nurses may advise nothing stronger than simple albolene in case of cold or nasal irritation.

## BOOK REVIEW

### DISEASES OF THE THYROID GLAND\*

By

ARTHUR E. HERTZLER, M. D.

*with a chapter on the Hospital Management of Goiter Patients by Victor E. Cheskey, M.D.*  
Second Edition

The C. V. Mosby Company, St. Louis, 1929

HERTZLER — THYROID DISEASE — REVIEW

In the first chapters the author discusses Etiology, Age and Sex incidence. A closer connection exists between the interstitial form of goiter and ovarian dysfunction, than is met with in the ordinary toxic goiter. A flaring up of thyroid toxemia in hitherto quiescent goiters is noted occasionally at the time of surgical pelvic disease, at the climacterium or later. Heredity may play a part. Why goiters become toxic and why they degenerate is not explained on the basis of the Iodine-deficiency theory, while the endemic incidence of certain types of goiters is well explained thereby. The relation of goiter to infection, to previous and to associated disease and to neurogenesis are not favored; the thyrogenic theory is accentuated and, in this connection, the need of a very careful clinical diagnosis is emphasized. A goiter may exist which has nothing to do with the symptoms of which the patient complains. In chapter 2 the gross and the microscopical anatomy of the gland is discussed. Chapter 3 is devoted to the pathological anatomy. It is emphasized right from the beginning that goiter-pathology is only an adjunct to careful clinical observation and records. If fetal adenomas show solid active proliferation of their cells with papillary or columnar arrangement, then they are malignant from the histological point of view. Yet, as long as that change occurs strictly within their own substance and the capsule remains intact, they

(Continued on page XVII)

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## EDITORIALS

### COMMERCIALIZING MEDICINE

In the strenuous competitive life of today there is no surprise when commercialism creeps into the medical profession. The mechanical age has instilled into people a reverence for mechanistic apparatus and a faith in mechanistic means for the alleviation of human suffering. There is no wonder that some physicians encourage this tendency to the enrichment of themselves without giving adequate returns to the patient.

This is, however, not a new problem, because there have always been in the profession two distinct groups. The one strives to practice the profession as a true science with a real sense of responsibility, while the other yields to the lure of popular reputation by means not always ethical.

A paragraph from a Report of Committee on Medical Education of 1855, shows that even 75 years ago this was a real problem. "So strong is the influence of these motives that the strictly honorable physician maintains his honor and integrity, only by a constant struggle against severe temptation; and some practitioners in good

standing yield more or less to the temptation and expend much of those energies needed in the prosecution of the science upon the practice of arts akin to those which secure popular favor and pecuniary reward to the 'quack' and the pretender."

### PUBLICITY AND PARROTS

Every physician is nagged, bored, amused or at times annoyed by quotations from the public press on medical matters which are constantly being brought to his attention by his patients. In addition to the advertisements of nostrums which are constantly leading his less intelligent patients far astray, wonderful, new and "epoch-making" discoveries in this line or in that are constantly being brought to his attention often, it is sad to say, by hopeless sufferers from chronic incurable disease. The reports of new work on the cure of cancer, or substitutes for insulin that can be taken by mouth, or the like, described in big headlines in the newspapers, send many a patient hurrying to his doctor in the hope that he may have received the first news of something that may mean new life for him. This hope, unfortunately is almost never realized. "If you read it in the newspapers don't believe it" gets to be the almost universal advice which is given to the laity on medical matters. The recent work of the Chicago investigators, Falk and his associates, on the etiology of influenza is a case in point and in this instance, as usual, the comment of the Journal of the American Medical Association is appropriate—"The furore is inexcusable."

But there is another side to the picture. In accurately reporting the well considered statements of conservative medical men on subjects to a knowledge of which the public has a right, the press of the country performs a real service. At the time a year ago when a country-wide epidemic of influenza was threatening to reach this State, the calm, and careful comments of the Providence Superintendent of Health were of the greatest value to the community. At the present time when the unfamiliar psittacosis, the "parrot disease," has appeared here and elsewhere in the country, the press is again doing a real service by accurately reporting authoritative statements on the subject. While it is true that the natural desire to make such news, which is indeed un-

usual and striking, as much of a sensation as possible has led to larger headlines and more front page space than the situation really demands, it is fair to state that so far at least the facts seem to have been accurately presented. It is safe to say that through this publicity the public has been very definitely and promptly put on its guard and that many medical men who might otherwise never have had the condition brought to their attention will be on the watch for the disease. Unquestionably the end result will be the prevention of many cases of the disease and thus the saving of lives.

### MENTAL ACTIVITY IN MEDICINE

Doctors some distance from a medical college often complain of a lack of facilities for and an incentive to study. There can be no doubt about the great value of a medical school to physicians who practice under its influence. The college crystalizes medical knowledge and puts it within easy reach of the physician. There are other ways of doing the same thing however, in regions where medical colleges do not exist. Hospitals can easily take over the teaching obligation, for teaching should be obligatory, and supply not merely information on disease, but furnish an inspiration for further study on the part of the practitioner. The various departments of the hospital alone or in combination with each other may give excellent clinics. For example the surgical service or the medical service together with the X-ray or pathological department might have meetings at regular intervals or the X-ray or pathological department could give a series of clinics alone. The opportunity of the general hospital in influencing the medical profession is greater than it has ever been. Both the hospitals and the profession must prepare themselves to take full advantage of this chance.

### CASE REPORT

#### REPORT OF A POST OPERATIVE DEATH

ANTHONY CORVESE, M.D.  
EVERETT H. S. SMILEY, M.D.

*History:* L. O., Age 17, a white girl, was first seen on January 31, 1928, at H. G. S. Gyn. Clinic. She complained of pain in the right lower quadrant of the abdomen, which had its onset three



weeks previously. The day before she was seen, she stated that the pain was so severe that she almost fainted and vomited twice.

She had had sexual intercourse since age of 5 yrs. A tonsilectomy was done 4 years ago. Five months ago she was at R. I. H., O. P. D. for a skin eruption, she was told it was a serious case and was advised to go to Boston (this had not been verified). She gave a history of bed wetting until present time. The remainder of the history was unimportant.

*Examination:* Well developed, well nourished, sallow complexion girl; Temp. 99; Pulse 78; Heart and Lungs were negative. On the skin of the chest, front and back, there were large whitish blotches. The abdomen was slightly distended, tenderness on palpation over R. L. Q., very slight rigidity and no spasm. The external genitals were covered with a foul creamy discharge, urethral meatus was red and slightly swollen. The cervix showed endo-cervicitis with erosion of lower lip. The corpus uteri was in moderate retro-version and pulled over to the left slightly, but was easily brought in normal anterior position, size normal, mobility normal. There was some general pelvic tenderness, but no masses made out. A diagnosis of endo-cervicitis and salpingitis was made.

The Wasserman and Hinton tests were negative; 4 sets of urethral and cervical smears were negative for G. C.

From January 31, 1928 to May 20, 1929, she was seen 22 times at the clinic, with following points of interest:

From February 11, 1928 to February 1, 1929, she was comparatively free from pain in R. L. Q. but after this until the operation, she complained almost constantly of pain. She had a period of amenorrhea for 3 months, January to March 1929.

On June 23, 1928 she was given a diathermy treatment to cervix, after this the erosion healed and discharge ceased. On Dec. 15, 1928, she complained of pain in L. L. Q.

On March 2, 1929, she complained of large and painful breasts which had been gradually increasing for 2 months and at times secretion came from nipples. Examination showed both breasts large, firm and tender. This gradually subsided.

From March to date of admission to City Hospital, the pain in R. L. Q. was constant and more severe. At no time did vaginal examination reveal tubo-ovarian masses.

On May 20, she was referred to City Hospital with tentative diagnosis of salpingitis and for further study.

*Examination at Hospital:* Temp. 98 to 99; Pulse 68 to 90; Lungs negative. Heart: Slight roughening of sounds. Accentuated P2.

On May 22, a cystoscopy, ureteral catheterization and pyelogram was done. Normal flow from both kidneys. The urine from left kidney showed a few r.b.c. and w.b.c. and few granular casts. Culture sterile. From the right kidney, urine showed a few squamous epithelial cells, culture sterile.

The pyelograms showed normal pelves and calices on both sides.

On June 7, 1929, a laparotomy was performed. A Pfannenstiel transverse incision was made. The uterus and appendages were normal except for small corpus luteum cyst of the right ovary. The appendix was filled with fecoliths but was not inflamed. An appendectomy and puncture of corpus luteum cyst of right ovary was performed.

*Post Operative Notes:* For first 5 days patient's temperature ranged from 99 to 102; pulse from 90 to 120; she complained of considerable pain in right side, there was no vomiting, good urinary excretion and good bowel movements.

On June 13, 6 days post-operative, she complained of increased abdominal pain, vomiting and she appeared slightly jaundiced. Inspection of the wound showed no infection, abdomen was soft. She was given glucose intravenously 250 cc and 500 cc normal saline.

A blood culture on morning before death was sterile.

Icterus Index was 35; W. B. C. 28,800.

The vomiting and jaundice increased and on June 15, 8 days post-operative, she died at about 6 p. m.

The autopsy was performed 9 hours post-mortem by Dr. Chadwick and Dr. Faherty.

The Peritoneal cavity was found free from fluid and adhesions. The appendix was replaced by a clean stump and there was no apparent inflammation at the site of the operation. The spleen was soft and mushy and suggested a septic spleen. The striking feature of the autopsy was the appearance of the heart which showed very many hemorrhages into the muscle wall. These hemorrhages penetrated to a depth of about 1/8 inch in

the left ventricle wall. The right ventricle showed similar hemorrhages but not so extensive as on the left side. The right papillary muscle and the right side of the interventricular septum showed a very marked and extensive hemorrhages into the muscle tissue. This extension was not noticed on the left side of the heart. Cultures taken post-mortem from the spleen, peritoneal cavity and the line of incision all proved negative. A blood culture, taken post-mortem, showed the presence of an organism which on culture resembled *B. mucosus capsulatus*. It is very difficult, however, to link up this organism with the cause of death, particularly as a blood culture done ante-mortem the day of death proved sterile.

A microscopic examination of the organs showed definite hemorrhages into the myocardium and into the kidney but the particular interesting feature was the appearance of the liver. This showed multiple mid-zonal necrotic areas together with evidence of inflammation. The picture is that of a hepatitis which in all probability resulted in a toxemia causing the hemorrhagic myocarditis. Whether this hepatitis was of infectious or toxic origin, possibly due to the anaesthesia, it is impossible to determine definitely. The fact that a blood culture taken ante-mortem proved sterile and the cultures taken from the organs post-mortem proved sterile would seem to rule out the infectious origin.

The slides were sent to Dr. Lawrence W. Smith, assistant professor of Pathology at Cornell for his study. He wrote the following report:

"I have been over the slides from your autopsy case and have shown them to Dr. Ewing. I think they are very difficult to interpret with any degree of assurance. We are both inclined to feel that death was the result of a severe toxemia in relation to the operative procedure. It would be interesting to know the anaesthetic employed, the duration of the anaesthesia, the amount of handling of the tissues at the time of operation, and such associated details as might be factors in accentuating such a picture. Then also the possibility of stasis lymphaticus being present in addition to the other pathology might have been another factor. It is the most extensive hemorrhagic lesion I have seen in the myocardium. The liver is obviously badly damaged with areas of almost focal necrosis."

The slides were also sent to Dr. Mallory at the Boston City Hospital who replied as follows:

"The important lesion in your case is the multiple necroses in the liver. Their focal distribution suggests an infectious rather than a toxic origin. They were due perhaps to invasion by streptococci secondary to the appendicitis. The hemorrhages in the heart are probably of toxic origin secondary to the liver."

Presented with specimen at meeting of Providence Medical Society October 7, 1929.

## SOCIETIES

### PROVIDENCE MEDICAL ASSOCIATION

The regular monthly meeting of the Providence Medical Association was called to order by the President Dr. Clinton S. Westcott, Monday evening, February 3, 1930, at 8:45 o'clock. The records of the last meeting were read and approved.

The President appointed as an Obituary Committee for Dr. Sanford S. Burton: Dr. Harry S. Flynn and Dr. Jacob S. Kelly.

The Standing Committee having approved their applications the following were admitted to membership: Robert R. Baldrige, John A. Gormly and Antonio F. D'Angelo.

The first paper of the evening on Pre-operative Risks was read by Dr. Albert H. Miller. He finds blood pressure to be the best test of risk. If the pulse pressure is less than 25 or more than 75 the case is inoperable. Next is the breath holding test, less than 25 seconds suggests cardiac decompensation. Basal metabolism is of great value in thyroid cases. Low hemoglobin is serious. Blood chemistry exams showing the figures for urea creatinin and blood sugar is very important. A simple test for acidosis by estimating  $\text{CO}_2$  in the alveolar air was shown. Urinary function can be easily estimated by the phenolphthalein method.

He outlined the very complete routine examination which he makes before operation and explained how the patients condition and operative procedures are balanced against each other. Dr. Miller presented a series of anesthesia charts illustrating many of these points. The paper was discussed by Drs. John W. Keefe, DeWolf, A. T. Jones Burgess and Saklad.

A moving picture—Technique of Blood Transfusion was shown. Discussed by Dr. C. O. Cooke.

Meeting adjourned at 10:35 P. M. Attendance 105.

Collation was served.

Respectfully submitted,

PETER PINEO CHASE,  
Secretary.

### THE R. I. OPHTHALMOLOGICAL AND OTOLOGICAL SOCIETY

The R. I. Ophthalmological and Otolological Society met at the Rhode Island Medical Library Thursday, Feb. 13, 1930. Papers, clinical meeting. Each member was urgently requested to present one or more clinical cases.

F. W. DIMMITT, M.D.,  
Secretary.